PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 20041001 WO	**FOR FURTHER ACTION** See Form PCT/IPEA/416	
International application No. PCT/FI2005/000010	International filing date *(day/month/year)* 10-01-2005	Priority date *(day/month/year)* 15-01-2004
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant Outokumpu Technology Oy et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
14-11-2005	12-04-2006
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Mårten Hulthén/MP Telephone No. +46 8 782 25 00

Form PCT/IPEA/409 (cover sheet) (April 2005)

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Cover sheet

International patent classification (IPC)

C22B15/00 (2006.01)
F27D 3/18 (2006.01)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
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Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____ ,
which is the language of a translation furnished for the purposes of:

☐ international search (Rules 12.3(a) and 23.1(b))

☐ publication of the international application (Rule 12.4(a))

☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-7 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 8-10 received by this Authority on 03-02-2006

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-3 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI2005/000010

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-13	YES
	Claims		NO
Inventive step (IS)	Claims	1-13	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-13	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Amended claims 1-13 were filed on 3 February 2006.

Documents considered as being of particular relevance:
D1 US 6001148
D3 DE 3201608

The invention is intended to make a concentrate bin for a suspension smelting furnace easier and less expensive to arrange. This is achieved by locating the bin below the level of the top of the reaction shaft and close to the ground level.

D1 (abstract; figures 1 and 5) discloses a smelting furnace where the charge is fed through a burner. D3 discloses another smelting furnace which has no burner on top of the reaction shaft. Both D1 and D3 disclose outlets of a bin located below the top of the reaction shaft.

However, neither D1 nor D3 disclose a suspension smelting furnace or a concentrate burner as stated in the claims of the application. Consequently, the invention as defined in the claims is novel.

The stated differences imply improvements in simplifying the feeding device and also in achieving a continuous and reliable feed of concentrate to a concentrate burner located on top of a suspension smelting furnace.

Therefore, the invention as defined in claims 1-13 is considered to involve an inventive step and also to fulfil the criteria of industrial applicability.

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CLAIMS:

1. An installation for providing a concentrate burner, that is adapted on top of a reaction shaft of a suspension smelting furnace, with continuous and constant feed of fine-grained matter, comprising
a bin having an inlet and an outlet for the fine-grained matter;
a feed control unit for providing the feed of the fine-grained matter with accurately controlled feed rate; and
a pneumatic conveyor adapted to transport the fine-grained matter up to the top level of the suspension smelting furnace;
characterized in that,
the outlet of the bin for the fine-grained matter locates essentially at a lower level than the top of the reaction shaft;
the feed control unit is adapted to receive the fine-grained matter from the outlet of the bin and to provide the pneumatic conveyor with the feed of the fine-grained matter;
the pneumatic conveyor is adapted to provide the concentrate burner with a feed rate that equals with the feed rate provided by the feed control unit; and
the concentrate burner is a sleeve type burner or a diffusion type burner.

2. The installation of claim 1, characterized in that the fine-grained matter comprises metal concentrate.

3. The installation of claim 1, characterized in that the fine-grained matter comprises metal concentrate and fluxing agent.

4. The installation of claim 1, characterized in that the fine-grained matter comprises metal concentrate, fluxing agent and flue dust.

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5. The installation of claim 1, characterized in that it comprises a first bin for a dried mixture of metal concentrate and fluxing agent, a second bin for flue dust, a first feed rate controller for the mixture of metal concentrate and fluxing agent and a second feed rate controller for the flue dust.

6. The installation of claims 1 – 5, characterized in that the pneumatic conveyor is a dilute-phase pneumatic conveyor.

7. The installation of claims 1 – 5, characterized in that the pneumatic conveyor is a dense-phase pneumatic conveyor.

8. The installation of claims 1 – 5, characterized in that the pneumatic conveyor is an air-lift type pneumatic conveyor and the air-lift is provided with an expansion vessel adapted to feed the particulate matter into the burner of the suspension smelting furnace via an air-lock feeder and an air-slide conveyor.

9. The installation of claims 1 – 5, characterized in that the feed control unit is a loss-in-weight controller and the pneumatic conveyor is a dilute-phase pneumatic conveyor.

10. The installation of claims 1 – 5, characterized in that the feed control unit is a loss-in-weight controller and the pneumatic conveyor is an air-lift type pneumatic conveyor.

11. A method of providing a concentrate burner such as a sleeve type burner or a diffusion type burner, that is adapted on top of a reaction shaft of a suspension smelting furnace, with uninterrupted and controlled feed of fine-grained matter comprising metal concentrate, **characterized** in that the method comprises steps of

feeding fine-grained matter in a bin having an outlet at a lower level than

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the burner;

forming and sustaining in the bin a storage of the fine-grained matter corresponding with at least one hours feed of the suspension smelting furnace;

feeding fine-grained matter in a feed rate controller unit that provides the pneumatic controller with an uninterrupted and controlled feed of the fine-grained matter; and

conveying the matter with the pneumatic conveyor in the burner of the suspension smelting furnace.

12. The method of claim 11, characterized in that the feed rate controller operates according to the principle of loss-in weight - type controller.

13. The method of claim 11, characterized in that it further comprises a step of feeding flue dust into the pneumatic conveyor.